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EXAMINER

SERRAO, RANODHI N

ART UNIT PAPER NUMBER

2141

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/056,238

Applicant(s)

EDSALL ET AL.

Examiner

Ranodhi Serrao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-61 is/are rejected.
- 7) ☒ Claim(s) 57 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 02 September 2005 have been fully considered but they are not persuasive. As per the applicant's arguments regarding claim 4, Lo teaches the amended claim, see rejection below. Logic is dictated to and implemented by a port of the network device by Lo, see paragraph 0286 and 0297.
2. As per the applicant's arguments regarding the prior art reference of Blumenau, Blumenau teaches the limitation, "wherein the network device is a switch, router, iSCSI gateway, or other network node configured to perform a switching function," see rejections below. Blumenau also teaches claim 18 as amended, see rejection below.
3. With respect to the argument of claim 19, Blumenau discloses, "One of the storage adapters 37, 38 responds to the storage access request by performing a logical-to-physical translation to determine where the data to be accessed resides on the storage devices, and reads the data from the storage devices and writes the data to the cache memory, for access by the port adapter," see col. 8, lines 48-65. Therefore, along with the rejection of claim 19 below, Blumenau discloses requesting a lock of the one or more physical storage locations.
4. With respect to the argument of claim 21, Blumenau discloses, "It is desirable to share a persistent volume access table among a number of transient volume access tables in the case where a host controller may access the same volume group from the ports of different port adapters, since this avoids duplication of persistent volume access

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table entries that would otherwise occur," see col. 16, lines 15-49. Therefore, Blumenau does teach sending a lock request to another port of a network device.

### ***Claim Objections***

5. Claim 57 is objected to because of the following informalities: A claim can only have one preamble. This claim contains multiple preambles in line 2 and 3. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 3-11, 13, 16, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Lo et al. (2002/0103943).

8. As per claim 1, Lo et al. teaches a method of implementing storage virtualization on a network device of a storage area network (paragraph 0037), the method comprising: (a) receiving a frame or packet at a port of the network device (paragraph 0090), wherein the network device is a switch, router, iSCSI gateway, or other network node configured to perform a switching function (paragraph 0069); (b) determining that the frame or packet pertains to access of a virtual storage location of a virtual storage unit representing one or more physical storage locations on one or more physical storage units of the storage area network (paragraph 0239); (c) obtaining a virtual-physical mapping between the one or more physical storage locations and the virtual

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storage location (paragraph 0239); and (d) sending a new or modified frame or packet to an initiator or a target specified by the virtual-physical mapping (paragraphs 0245 and 0415).

9. As per claim 3, Lo et al. teaches a method, wherein the virtual storage unit comprises a VLUN or other virtual representation of storage on the storage area network (paragraphs 0037 and 0422).

10. As per claim 4, Lo et al. teaches a method, wherein (b), (c), and (d) are performed by logic dedicated to and implemented by said port of the network device (paragraphs 0225 and 0248-0249).

11. As per claim 5, Lo et al. teaches a method, wherein the frame or packet received at the port of the network device is a fibre channel frame (paragraph 0064).

12. As per claim 6, Lo et al. teaches a method, wherein the frame received at the port of the network device is an iSCSI frame (paragraph 0069).

13. As per claim 7, Lo et al. teaches a method, wherein the frame or packet received at the port of the network device comprises a read or write command (paragraph 0334).

14. As per claim 8, Lo et al. teaches a method, wherein the frame or packet received at the port of the network device comprises a SCSI read or write command (paragraph 0336).

15. As per claim 9, Lo et al. teaches a method, wherein determining that the frame or packet pertains to access of a virtual storage location comprises identifying an address of the virtual storage unit in the frame or packet from the initiator (paragraph 0404).

16. As per claim 10, Lo et al. teaches a method, wherein the address is a destination address (paragraph 0405).

17. As per claim 11, Lo et al. teaches a method, wherein determining that the frame or packet pertains to access of a virtual storage location comprises identifying an address of the port in a destination address field of the frame or packet from the target (paragraph 0415).

18. As per claim 13, Lo et al. teaches a method, wherein the virtual-physical mapping is defined by a virtualization model (paragraph 0404).

19. As per claim 16, Lo et al. teaches a method, the method further comprising: generating a new packet or frame or modifying the received packet or frame in a manner that replaces a source address of the initiator with an address of the port on the network device (paragraph 0405).

20. As per claim 17, Lo et al. teaches a method, the method further comprising: generating a new packet or frame or modifying the received packet or frame in a manner that replaces a destination address of the port on the network device with a destination address of the virtual storage unit (paragraph 0407).

21. Claims 1, 12, 14, 18-61 are rejected under 35 U.S.C. 102(e) as being anticipated by Blumenau et al. (6,260,120).

22. As per claim 1, Blumenau et al. teaches a method of implementing storage virtualization on a network device of a storage area network (column 8, lines 5-7), the method comprising: (a) receiving a frame or packet at a port of the network device

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(column 12, lines 9-17), wherein the network device is a switch, router, iSCSI gateway, or other network node configured to perform a switching function (col. 18, lines 35-51 and col. 40, lines 44-53); (b) determining that the frame or packet pertains to access of a virtual storage location of a virtual storage unit representing one or more physical storage locations on one or more physical storage units of the storage area network (column 25, lines 29-49); (c) obtaining a virtual-physical mapping between the one or more physical storage locations and the virtual storage location (column 24, lines 34-55); and (d) sending a new or modified frame or packet to an initiator or a target specified by the virtual-physical mapping (column 30, lines 24-45).

23. As per claim 12, Blumenau et al. teaches a method, wherein the virtual storage unit is a virtual logical unit and the one or more physical storage units are physical logical units (column 30, lines 24-45).

24. As per claim 14, Blumenau et al. teaches a method, the method further comprising: generating one or more new packets or frames or modifying the received packet or frame in a manner that replaces a destination address of the virtual storage unit with one or more destination addresses of the one or more physical storage units (column 12, lines 9-17).

25. As per claim 15, Blumenau et al. teaches a method, the method further comprising: generating a new packet or frame or modifying the received packet or frame in a manner that replaces a source address of a physical storage unit with a source address of the virtual storage unit (column 12, lines 18-26).

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26. As per claim 18, Blumenau et al. teaches a method, wherein (b), (c), and (d) are performed by a processor dedicated to only said port of the network device (col. 1, line 61-col. 2, line 18).

27. As per claim 19, Blumenau et al. teaches a method, further comprising requesting a lock of the one or more physical storage locations prior to submitting a read or write command to the one or more physical storage locations (column 29, lines 6-30).

28. As per claim 20, Blumenau et al. teaches a method, wherein requesting a lock of the one or more physical storage locations comprises requesting a lock of the virtual storage location (column 29, line 57-column 30, line 20).

29. As per claim 21, Blumenau et al. teaches a method, wherein requesting a lock of the one or more physical storage locations comprises: sending a lock request to another port of a network device within the storage area network (column 19, lines 4-31).

30. As per claim 22, Blumenau et al. teaches a method, further comprising: receiving a lock grant from the another port of the network device within the storage area network (column 29, line 57-column 30, line 20).

31. As per claim 23, Blumenau et al. teaches a method, wherein the granted lock indicates that at least one of exclusive read and write access to the virtual storage location is granted (column 29, line 57-column 30, line 20).

32. As per claim 24, Blumenau et al. teaches a method, further comprising: sending a transfer ready message to the initiator when the lock grant is received (column 8, lines 48-65).



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33. As per claim 25, Blumenau et al. teaches a method, further comprising: requesting a release of the granted lock from the another port of the network device within the storage area network (column 16, lines 50-59).

34. As per claim 26, Blumenau et al. teaches a method, further comprising: receiving a notification that the granted lock has been released by the another port (column 12, line 66-column 13, line 12).

35. As per claim 27, Blumenau et al. teaches a method, wherein requesting a release of the granted lock is performed when the read or write command has been successfully completed (column 21, lines 6-42).

36. As per claim 28, Blumenau et al. teaches a method, wherein the command has been successfully completed when a status indicating that the command was successful is received from the initiator or the target (column 21, lines 6-42).

37. As per claim 29, Blumenau et al. teaches a method, wherein the frame or packet received at a port of the network device comprises a read or write command indicating an amount of memory to be read or written to, the method further comprising: allocating the amount of memory at the network device (column 16, lines 50-59).

38. As per claim 30, Blumenau et al. teaches a method, further comprising: receiving a status from the target after the sending of the new or modified frame or packet to the target (column 11, lines 1-14); and when the status indicates that the command was successful, de-allocating the amount of memory at the network device (column 32, lines 19-33).

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39. As per claim 31, Blumenau et al. teaches a method, wherein the frame or packet received at a port of the network device comprises a read or write command, the method further comprising: receiving a transfer ready signal from the target after the sending of the new or modified frame or packet, the transfer ready signal indicating that the target is ready to receive a transfer of data (column 8, lines 48-65).

40. As per claim 32, Blumenau et al. teaches a method, further comprising: sending a transfer ready signal to the initiator after the sending of the new or modified frame or packet, the transfer ready signal indicating that the network device is ready to receive a transfer of data from the initiator; wherein sending the transfer ready signal to the initiator is performed prior to receiving a transfer ready signal from the target (column 8, lines 48-65).

41. As per claim 33, Blumenau et al. teaches a method, wherein the frame or packet received at a port of the network device comprises a read or write command, the method further comprising: receiving a status after the sending of the new or modified frame or packet, the status indicating whether the command was successful (column 21, lines 6-42).

42. As per claim 34, Blumenau et al. teaches a method, further comprising: sending the status to the initiator (column 21, lines 6-42).

43. As per claim 35, Blumenau et al. teaches a method, further comprising: sending a second new or modified frame or packet to an initiator or a target specified by the virtual-physical mapping (column 30, lines 24-45); receiving a second status after the sending of the second new or modified frame or packet, the second status indicating

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whether the command was successful (column 21, lines 6-42); merging the status and the second status (column 21, lines 6-42); and sending the merged status to the initiator (column 21, lines 6-42).

44. As per claim 36, Blumenau et al. teaches a method, further comprising: determining from the status whether the command was successful (column 21, lines 6-42); and re-sending the new or modified frame or packet when it is determined that the command was not successful (column 21, lines 43-58).

45. As per claim 37, Blumenau et al. teaches a method, further comprising: sending the status to the initiator when it is determined that the command was successful (column 21, lines 6-42).

46. As per claim 38, Blumenau et al. teaches a method, wherein the new or modified frame or packet comprises data (column 12, lines 9-17).

47. As per claim 39, Blumenau et al. teaches a method, wherein the new or modified frame or packet comprises a read or write command (column 8, line 48-65).

48. As per claim 40, Blumenau et al. teaches a method, wherein the frame or packet received at a port of the network device comprises data, the method further comprising: storing the data in a memory location; wherein re-sending the new or modified frame or packet comprises: obtaining the data from the memory location; and sending a new or modified frame or packet including the obtained data to the initiator or the target specified by the virtual-physical mapping (column 30, lines 24-45).

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49. As per claim 41, Blumenau et al. teaches a method, further comprising: receiving data from the target specified by the virtual-physical mapping; and storing the data in a memory location (column 30, lines 24-45).

50. As per claim 42, Blumenau et al. teaches a method, wherein re-sending the new or modified frame or packet comprises: obtaining the data from the memory location; and sending a new or modified frame or packet including the obtained data to the initiator specified by the virtual-physical mapping (column 30, lines 24-45).

51. As per claim 43, Blumenau et al. teaches a method, wherein re-sending the new or modified frame or packet comprises sending the new or modified frame or packet to an alternate target specified by the virtual-physical mapping, the method further comprising: receiving alternate data from the alternate target specified by the virtual-physical mapping; and comparing the alternate data with the data stored in the memory location (column 8, lines 48-65).

52. As per claim 44, Blumenau et al. teaches a method, further comprising: employing a mirror algorithm to select the alternate target (column 9, lines 10-24).

53. As per claim 45, Blumenau et al. teaches a method as recited in claim 1, wherein the frame or packet received at the port of the network device and the new or modified frame or packet sent by the network device are compatible with a standard protocol (column 9, lines 25-49).

54. As per claim 46, Blumenau et al. teaches a method, wherein the standard protocol is SCSI (column 9, lines 25-49).

55. As per claim 47, Blumenau et al. teaches a method, wherein the frame or packet received at the port of the network device and the new or modified frame or packet sent by the network device are compatible with a type of traffic to be carried by the frames or packets (column 9, lines 25-49).

56. As per claim 48, Blumenau et al. teaches a method, wherein the type of traffic is fibre channel (column 9, lines 25-49).

57. As per claim 50, Blumenau et al. teaches a method, wherein the frame or packet received at the port of the network device comprises a SCSI read command and the new or modified frame or packet sent by the network device comprises a SCSI read command (column 34, lines 20-32).

58. As per claim 51, Blumenau et al. teaches a method, wherein the frame or packet received at the port of the network device comprises a SCSI write command and the new or modified frame or packet sent by the network device comprises a SCSI write command (column 34, lines 33-47).

59. As per claim 52, Blumenau et al. teaches a method, wherein the frame or packet received at the port of the network device comprises a read command and the new or modified frame or packet sent by the network device comprises a read command (column 34, lines 20-32).

60. As per claim 53, Blumenau et al. teaches a method, wherein the frame or packet received at the port of the network device comprises a write command and the new or modified frame or packet sent by the network device comprises a write command (column 34, lines 33-47).

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61. As per claims 54, 55, 56, and 58, the rejection of claim 1 under 35 USC 102(e) (paragraphs 19 above) applies fully.

62. As per claim 56, Blumenau et al. teaches a network device of a storage area network adapted for implementing storage virtualization, comprising: a processor (column 9, lines 25-49); and a memory (column 9, lines 25-49), at least one of the processor and the memory being adapted for: (a) receiving a frame or packet at a port of the network device (column 8, lines 5-7); (b) determining that the frame or packet pertains to access of a virtual storage location of a virtual storage unit representing one or more physical storage locations on one or more physical storage units of the storage area network (column 12, lines 9-17); (c) obtaining a virtual-physical mapping between the one or more physical storage locations and the virtual storage location (column 24, lines 34-55); and (d) sending a new or modified frame or packet to an initiator or a target specified by the virtual-physical mapping (column 30, lines 24-45).

63. As per claim 57, Blumenau et al. teaches a network device for use in a storage area network supporting virtualization, the network device comprising a plurality of ports, wherein at least some of said ports comprise (i) an interface for sending and receiving packets or frames on a storage area network (column 10, lines 15-30); wherein the network device is a switch, router, iSCSI gateway, or other network node configured to perform a switching function (col. 18, lines 35-51 and col. 40, lines 44-53); and (ii) logic dedicated to and implemented by said port of the network device, said logic for identifying frames or packets pertaining to access of a virtual storage location of a virtual storage unit representing one or more physical storage locations on one or more

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physical storage units of the storage area network (col. 8, lines 48-65 and column 12, line 66-column 13, line 21); and implementing a virtual-physical mapping between the one or more physical storage locations and the virtual storage location (column 10, lines 42-67).

64. As per claim 59, Blumenau et al. teaches a method, wherein the new or modified frame or packet includes at least one of a source address and destination address obtained from the virtual-physical mapping (column 12, lines 9-17 and column 12, lines 18-26).

65. As per claim 60, Blumenau et al. teaches a method, wherein the received frame or packet includes a source address and destination address, and wherein the obtained information includes at least one of the source address and the destination address (column 12, lines 9-17 and column 12, lines 18-26).

66. As per claim 61, Blumenau et al. teaches a method wherein sending a lock request to another port of a network device within the storage area network comprises: sending a lock request to another port of a switch, router, iSCSI gateway, or other network node configured to perform a switching function (column 19, lines 4-31).

### ***Claim Rejections - 35 USC § 103***

67. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

68. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenau et al. (6,260,120) as applied to claims 1, 45, and 47 above, and further in

view of Lo et al. (2002/0103943). Blumenau et al. teaches the mentioned limitations of claims 1, 45, and 47 above but fails to teach a method, wherein the type of traffic is iSCSI. However, Lo et al. teaches a method, wherein the type of traffic is iSCSI (see Lo et al. paragraph 0128). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the above limitation to add a method, wherein the type of traffic is iSCSI in order to employ the appropriate transport layer and upper-layer protocol combinations in the backbone. Also allowing over gigabit Ethernet based networks (see Lo et al. paragraph 0121).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ranodhi Serrao whose telephone number is (571)272-7967. The examiner can normally be reached on 8:00-4:30pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rupal Dharia can be reached on (571)272-3880. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
RUPAL DHARIA  
SUPERVISORY PATENT EXAMINER